

REMARKS

Claims 1-32 are canceled without prejudice or disclaimer. Claims 33-64 are added. Claims 33-64 are supported by the specification and claims as originally filed.

The specification has been amended to address the informal objections.

Support for new claim 33 is found in original claims 1 and 4. New independent claim 29 recites that "the parent cutinase is at least 70% homologous to the cutinase of *H. insolens* strain DSM 1800" and that "the variant has above 80% homology to its parent." Support for these recitations is found in the specification at page 3, lines 18-21 and page 4, lines 21-22, respectively.

Support for claim 34 is found, e.g., in original claim 2.

Support for claim 35 is found, e.g., in original claim 4.

Support for claim 36 is found, e.g., at page 3, lines 18-21.

Support for claims 37-39 is found, e.g., at page 4, lines 21-22.

Support for claim 40 is found, e.g., in original claim 9 and in the specification at page 2, lines 13-15 and page 6, lines 5-8.

Support for claim 41 is found, e.g., in original claim 10.

Support for claim 42 is found, e.g., in original claim 11.

Support for claims 43 and 44 is found, e.g., in original claim 12.

Support for claim 45 is found, e.g., in original claim 13.

Support for claims 46-48 is found, e.g., at page 5, line 12 to page 6, line 1 and Example 2.

Support for claims 49-57 is found in original claim 1.

New independent claim 58 is supported, e.g., by original claims 1 and 7 and by specification at page 3, lines 18-21.

New independent claim 59 is supported, e.g., by original claim 8 and by the specification at page 3, lines 18-21 and page 4, lines 21-22, respectively.

Support for claim 60 is found, e.g., in original claim 4.

Support for claim 61 is found, e.g., at page 3, lines 18-21.

Support for claims 62-64 is found, e.g., at page 4, lines 21-22.

It is respectfully submitted that the present amendment presents no new issues or new matter and places this case in condition for allowance. Reconsideration of the application in view of the above amendments and the following remarks is requested.

I. The Specification

The specification is objected to as containing an improper hyperlink on page 3 and as not defining the abbreviation DSC. The hyperlink has been deleted from the specification. The specification has also been amended to provide the official terminology "Differential Scanning calorimetry" for the well-known abbreviation DSC.

Applicants respectfully request reconsideration and withdrawal of the objections.

II. Claim Objections

Claims 4, 8 and 13 are objected to for various informalities. Applicants respectfully submit that the claim objections are rendered moot by the new claims. Applicants respectfully request reconsideration and withdrawal of the claim objections.

III. The Rejection of Claims 1, 2, 4 and 7-13 under 35 U.S.C. 112

Claims 1, 2, 4 and 7-13 are rejected under 35 U.S.C. 112, as allegedly containing subject matter that is not described in the specification in such a way as to reasonably convey to one skilled in the art that, at the time the application was filed, the inventors had possession of the claimed invention. The rejection appears to be based on the Examiner's contention that the claims are drawn to an enormous genus of cutinases, and that sufficient identifying characteristics or properties other than the functionality of being a cutinase are not provided in the claims.

Applicants respectfully submit that the rejection is rendered moot by the new claims. New claims 29, 42 and 43 recite that the parent cutinase "is at least 70% homologous to the cutinase of *H. insolens* strain DSM 1800." Claims 29 and 43 also recite that the variant "has at least 80% homology to its parent" and new claim 42 recites that "the variant differs from the parent cutinase by 1 to 20 substitutions."

The new claims now provide additional identifying characteristics of both the parent cutinase and the variant, namely, in regard to the structure (amino acid sequence). An artisan would clearly conclude that applicants were in possession of not only of the variants of *H. insolens* strain DSM 1800, but also of variants which have a high degree of structural similarity to *H. insolens* strain DSM 1800, as is now defined in relation to both the referenced parent cutinases and the claimed variant cutinases.

For the foregoing reasons, Applicants submit that the claims overcome this rejection under 35 U.S.C. 112. Applicants respectfully request reconsideration and withdrawal of the rejection.

IV. The Rejection of Claims 1, 2, 4 and 7-13 under 35 U.S.C. 112

Claims 1, 2, 4 and 7-13 are rejected under 35 U.S.C. 112, first paragraph, as allegedly lacking enablement. The Examiner's rejection appears to center around the assertion that although the specification is enabled for mutants of SEQ ID NO:1, that the specification does not reasonably provide enablement for cutinases having unknown homology to SEQ ID NO:1 and based on the broad genus covered by the claims.

Applicants respectfully submit that the rejection is rendered moot by the new claims. As discussed in regard to the written description rejection, new claims 29, 42 and 43 recite that the parent cutinase "is at least 70% homologous to the cutinase of *H. insolens* strain DSM 1800." Claims 29 and 43 also recite that the variant "has at least 80% homology to its parent" and new claim 42 recites that variant "the variant differs from the parent cutinase by 1 to 20 substitutions." Accordingly, the new claims now provide additional identifying characteristics of both the parent cutinase and the variant, namely, characteristics of the amino acid sequence.

Based on the guidance provided in the specification, the high level of skill in the art, and the high degree of homology recited in the claims, the artisan would clearly be able to prepare the variants recited in the present claims without undue experimentation.

For the foregoing reasons, Applicants submit that the claims overcome this rejection under 35 U.S.C. 112. Applicants respectfully request reconsideration and withdrawal of the rejection.

V. The Rejection of Claims 1, 2, 4, 7 and 9-13 under 35 U.S.C. 112, Best Mode

Claims 1, 2, 4, 7 and 9-13 are rejected under 35 U.S.C. 112, on the basis that the specification allegedly does not disclose the best mode of carrying out the claimed invention. The Examiner asserts that Applicants have failed to comply with the best mode by not disclosing which are the "three variants from 29 variants disclosed on pages 26-17" that are the more stable cutinases referenced on page 28, lines 4-11. This rejection is respectfully traversed.

The best mode requirement involves a two-prong inquiry:

1. At the time of filing, did the inventor(s) possess a best mode of practicing the claimed invention; and
2. If the inventor possessed a best mode of practicing the invention, does the written description disclose the best mode such the one reasonably skilled in the art could practice the invention.

See Eli Lilly & Co. v. Barr Laboratories, Inc., 58 USPQ2d 1896, 1874 (Fed. Cir. 2001).

Notably, the best mode requirement focuses on the invention as claimed in the patent or application. See, e.g., *Christianson v. Colt Indus*, 3 USPQ2d 1241, 1255 (Fed. Cir. 1987).

Under this standard, the asserted best mode rejection is clearly improper. At the fundamental level, there can be no best mode violation when the best mode of the claimed invention is disclosed by the applicant. The claimed invention is directed to cutinase variants. Thus, if there is a best mode for the claimed invention, Applicants submit that the best mode would be the cutinase variants, namely, which amino acids were changed to result in an improvement (i.e., as this is the claimed invention). See *Christianson* at 1255. In this regard, Applicants have fully complied with the best mode requirement because they have disclosed the claimed cutinase variants.

There is no requirement under 35 U.S.C. 112 that Applicants specifically identify which particular cutinase variant is the inventors consider to be their best mode, rather Applicants are only required to disclose the best mode, that is, by disclosing the variants. Indeed, the Board of Patent Appeals and Interferences has clearly stated this point:

there is no requirement in 35 U.S.C. 112 that an applicant point out which of his embodiments he considers his best mode; the disclosure includes the best mode contemplated by the applicant is enough to satisfy the statute.

See *Ernsthausen v. Nakayama*, 1 USPQ2d 1539 (Bd. Pat. App. & Int'f 1985). Accordingly, Applicants have fully complied with the best mode by disclosing the variants, and the Applicants failure to specifically identify which of the disclosed variants is the "best mode" does not amount to a best mode violation.

Although Applicants submit that the best mode is disclosed, the Examiner nevertheless appears to take issue that Applicants state in the specification on page 28 that "[t]hree of the variants" were found to be more thermostable, but Applicants then did not disclose which three variants are "more thermostable."

First, it should be noted that there are more than three variants which are more thermostable than the reference. Indeed, as clearly stated on page 27, lines 7-8, all of the 29 variants recited on pages 27-28 showed a distinct clearing zone whereas the reference did not.

The Examiner's mere speculation that the identification of these three particular variants (which had the best thermostability) is the best mode contemplated by the inventors is also plainly incorrect. Although the characteristic of increased thermostability is important for many applications and was listed in original claim 1 to further distinguish the variants from the parent, it is only one of many relevant properties of the enzymes an artisan (including the inventors of the

present application) would consider when determining the suitability of the enzyme for a particular application. That is, the particular thermostability of a variant clearly does not equate to best mode, as the performance of an enzyme turns on the particular application and many other factors associated with the enzyme. For example, even if a cutinase variant has the best thermostability of all of the 29 recited variants, the variant may still perform worse than other recited variants which have lower thermostability in a particular application, e.g., due to the variants stability in association with certain ingredients or conditions used in the application (e.g., calcium stability) or its activity on the intended substrate. This point is clearly shown by the fact that Applicants' disclose many different applications for the cutinase variants and accordingly different tests for determining the effectiveness of the variants in a particular application, e.g., in detergents (examples 3 and 5), in treating polyester (example 6); in cooking (example 7); as anti-pilling and in depilling (example 8); and on water absorption (example 9). Notably, applicants are not claiming a particular application that relies only on the thermostability of the enzyme, and, in fact, Applicants know of no such application in which thermostability is the sole factor relevant to the enzyme's performance. Applicants also know of no such universal test which could predict the performance of a cutinase in all possible applications based on its thermostability.

Thus, the fact that "three enzymes" had particularly good thermostability, even the best thermostability of the 29 variants tested, does not equate with a conclusion that the inventors, at the time of filing, believed that these three enzyme were the best mode of practicing the claimed invention. See *Eli Lilly & Co. v. Barr Laboratories, Inc.*, 58 USPQ2d 1896, 1874 (Fed. Cir. 2001). Indeed, both a scientific and commercial analysis reveals that although thermostability may be a factor related to how the enzyme might perform in a certain application, it does not equal best mode. Thus, the Examiner's speculation of equation of the "three variants" and thermostability with best mode is clearly improper.

Notwithstanding that the thermostability of an enzyme does not equal best mode, even if it did, there is still no best mode violation in the present case. Indeed, the second prong of the best mode determination assess whether "the written description disclose the best mode such the one reasonably skilled in the art could practice the invention." Thus, assuming for arguments sake that the "three variants" are the best mode (which Applicants dispute), Applicants fail to see how one skilled in the art would not be able to practice the best mode of the invention. Indeed, the Applicants specifically disclose the amino acid substitutions of the 29 variants, including the alleged three best modes. An artisan is therefore able to the make and use these variants- that is, practice the claimed invention.

Again, if the Examiner allegation is that one skilled in the art would not know which one is the best mode because Applicants have not specifically disclosed which are the three "best" (i.e., in terms of thermostability), this allegation would impose on Applicants a duty which is not required under 35 U.S.C. 112. As previously discussed, Applicants are only required to disclose the best mode, not identify what is the best mode. See *Ernsthausen v. Nakayama*, 1 USPQ2d 1539 (Bd. Pat. App. & Int'f 1985).

In any event, the thermostability of these cutinase variants and even which are the "three variants" with the best thermostability can be readily determined by the skilled artisan from Applicants disclosure simply by applying the test specifically disclosed in Examples 2-9 of the specification. At worst, not disclosing which are the "three variants" requires only some routine testing for the artisan; however, it clearly does not prevent the artisan from practicing these variants or amount to a best mode violation.

For the foregoing reasons, Applicants submit that there is clearly no best mode violation. Applicants respectfully request reconsideration and withdrawal of the rejection.

VI. The Rejection of Claims 1, 2, 4 and 7-13 under 35 U.S.C. 112, Second Paragraph

Claims 1, 2, 4 and 7-13 are rejected under 35 U.S.C. 112, second paragraph, as allegedly indefinite. The indefiniteness rejections are addressed below.

a. The claims are rejected as indefinite on the basis that the claims do not require that the variant is a cutinase. The new claims now recite that the "variant has cutinase activity."

b. The claims are rejected as indefinite on the basis that since the number in SEQ ID NO:1 refers to *H. insolens* strain DSM 1800 cutinase, it would be better to reference SEQ ID NO:1 for numbering and corresponding residues. Although reference to *H. insolens* strain DSM 1800 is clear, as suggested by the Examiner, the new claims now recite SEQ ID NO:1 for the numbering and corresponding residues.

c. Claim 2 is rejected as indefinite for the phrase "a preceding claim". The Examiner states that claim 1 should be recited. It is respectfully submitted that the new claims render this rejection moot.

d. Claim 4 is rejected as confusing for reciting "an amino acid sequence which can be aligned with the cutinase of *H. insolens* DSM 1800." It is respectfully submitted that the new claims render this rejection moot.

e. Claim 7 is rejected as unclear because "has" can be construed as open language. The Examiner suggests amending the claim to state "a variant cutinase that differs from the

parent cutinase by one to twenty substitutions." The Examiner's suggestion has been adopted for the new claims.

f. Claim 8 is rejected as confusing on the basis that the recitation "a substitution of at least on amino acid residue" reads on a single mutation within the combination. Applicants respectfully submit that this rejection is rendered moot by the new claims.

g. Claims 9 and 10 are stated to include redundancy because the recitation of using *H. insolens* cutinase for numbering is also provided in claim 1. As applied to the new claims, Applicants submit that although this language may be redundant, it provides additional clarity to the claims

i. Claims 12 and 13 are rejected for use of the phrase "particularly." Applicants respectfully submit that the new claims render this rejection moot.

k. Claim 13 is rejected as indefinite on the basis that "denaturation temperature is known to depend on pH, and without knowing the exact pH under which the measurement was done, it is impossible to know the metes and bounds of the claim. Applicants respectfully submit that this rejection is rendered moot by the new claims.

For the foregoing reasons, Applicants submit that the claims overcome the rejections under 35 U.S.C. 112, second paragraph. Applicants respectfully request reconsideration and withdrawal of the rejection.

VII. The Rejection of Claims 1, 2, 4, and 7-13 under 35 U.S.C. 102 over Yao et al.

Claims 1, 2, 4 and 7-13 are rejected under 35 U.S.C. 102(b) as anticipated by Yao et al. The Examiner states that Yao teaches a fungal cutinase that has a valine in a position corresponding to A130 in SEQ ID NO:1.

Yao et al. apparently discloses a wild-type cutinase. Moreover, Applicants respectfully submit that the new claims render this rejection moot as Yao et al. does not disclose, among other things, a cutinase which is at least 70% homologous to SEQ ID NO:1.

For the foregoing reasons, Applicants submit that the claims overcome this rejection under 35 U.S.C. 102. Applicants respectfully request reconsideration and withdrawal of the rejection.

VIII. The Rejection of Claims 1, 2, 4 and 7-13 under 35 U.S.C. 102 over Swelgard et al.

Claims 1, 2, 4 and 7-13 are rejected under 35 U.S.C. 102 as anticipated by Swelgard et al. The Examiner states that Swelgard et al. teaches a fungal cutinase that has a valine in a position corresponding to A130 in SEQ ID NO:1.

Swelgard et al. apparently discloses a wild-type cutinase. Moreover, Applicants respectfully submit that the new claims render this rejection moot as Swelgard et al. does not disclose, among other things, a cutinase which is at least 70% homologous to SEQ ID NO:1.

For the foregoing reasons, Applicants submit that the claims overcome this rejection under 35 U.S.C. 102. Applicants respectfully request reconsideration and withdrawal of the rejection.

IX. The Rejection of Claims 1, 2, 4, 7 and 9-13 under 35 U.S.C. 102 over Ettinger et al.

Claims 1, 2, 4 and 7-13 are rejected under 35 U.S.C. 102 as anticipated by Ettinger et al. The Examiner states that Ettinger et al. teaches a fungal cutinase that has a valine in a position corresponding to A130 in SEQ ID NO:1.

Ettinger et al. apparently discloses a wild-type cutinase. Moreover, Applicants respectfully submit that the new claims render this rejection moot as Ettinger et al. does not disclose, among other things, a cutinase which is at least 70% homologous to SEQ ID NO:1.

For the foregoing reasons, Applicants submit that the claims overcome this rejection under 35 U.S.C. 102. Applicants respectfully request reconsideration and withdrawal of the rejection.

X. Double Patenting

Claims 1, 2, 4 and 7-13 are provisionally rejected under the judicially created doctrine of obviousness-type double-patenting as being unpatentable over claims 35, 37, 38, 47 and 48 of co-pending Application no. 09/857,068. The Examiner contends that:

Although the conflicting claims are not identical, they are not patentably distinct from each other because base claim 35 in '068 is directed to a variant cutinase with a substitution within residues 3-12, 20-60, 130-132, 176-182 of *Humicola insolens* strain DSM 1800. Base claim 1 of the instant invention is directed to a variant cutinase with a substitution corresponding to positions in *Humicola insolens* strain DSM 1800 that fall within residues recited in claim 35, such as A130, for example. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to produce a variant with a substitution at each position within the fragments disclosed in '068.

The Examiner further notes that this is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.


Applicants hereby notify the Examiner that the conflicting claims in co-pending Application no. 09/857,068 were recently allowed. Submitted herewith is a terminal disclaimer obviating the double-patenting rejection. Applicants respectfully request reconsideration and withdrawal of the rejection.

XI. Conclusion

In view of the above, it is respectfully submitted that all claims are in condition for allowance. Early action to that end is respectfully requested. The Examiner is hereby invited to contact the undersigned by telephone if there are any questions concerning this amendment or application.

Respectfully submitted,

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